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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,194	02/05/2004	Yi-Chiau Huang	AMAT/8461/CMP/ECP/RKK	6951
44257	7590	12/20/2005	EXAMINER	
PATTERSON & SHERIDAN, LLP 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056			JEFFERSON, QUOVAUNDA	
			ART UNIT	PAPER NUMBER
			2823	

DATE MAILED: 12/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/774,194

Applicant(s)

HUANG, YI-CHIAU

Examiner

Quovaunda Jefferson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

Applicant's arguments filed November 7, 2005 have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., separate cells/chambers for heating and annealing a substrate) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

### ***Claim Objections***

Claim 20 is objected to because of the following informalities: Claim 20 is dependent upon a cancelled claim. Examiner is applying claim 20 to be dependent upon claim 17, but an appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 8, 13, and 14 are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh et al, US Patent 6,692,588.

Regarding claim 8, Uzoh teaches a method of processing a substrate, comprising of plating a conductive layer onto a substrate (column 3, lines 39-41), rinsing the substrate of unwanted residue chemicals (column 1, lines 44-46), preheating the substrate during the rinsing process to a temperature of between about 50°C and about 100°C (column 4, lines 11-12), and annealing the substrate at an annealing station at a temperature of between about 150°C and about 450°C subsequent to the preheating process (column 4, lines 13-45), wherein the preheating is conducted in a spin rinse dry cell (column 4).

Regarding claim 13, Uzoh teaches the method of claim 8, wherein preheating the substrate comprises applying radiant heat to the substrate during the rinsing (column 4, line 8).

Regarding claim 14, Uzoh teaches the method of claim 8, wherein the rinsing and preheating steps are conducted simultaneously (column 4, line 8).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et. al, US Patent Application 2002/0130046 and Uzoh et al, US Patent 6,692,588.

Regarding claim 1, Cheung teaches a method for processing a substrate, comprising of plating a conductive layer onto a substrate [0025], transferring the substrate from a plating cell to a cleaning cell ([0024] and [0025]), and transferring the

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substrate from the cleaning cell to an annealing station (paragraph 24 and 25). Cheung fails to teach heating the substrate in the cleaning cell and annealing the substrate at the annealing station at a temperature of between about 150°C and about 450°C.

Uzoh teaches heating the substrate in the cleaning cell (column 2, lines 25-26) and annealing the substrate at the annealing station at a temperature of between about 150°C and about 450°C (column 3, lines 32-33). It would have been obvious to one skilled in the art to combine the teachings of Cheung and Uzoh to create a more efficient and time saving method and apparatus for in-situ cleaning and annealing of a plated work piece (Uzoh, column 2, lines 3-4).

Regarding claim 2, Uzoh further teaches the method of claim 1, wherein heating the substrate comprises applying a rinsing solution having a temperature of between about 50°C and about 100°C (column 4, lines 11-13).

Regarding claim 3, Uzoh further teaches the method of claim 1, wherein heating the substrate comprises applying a rinsing solution having a temperature of between about 75°C and about 100°C and drying the substrate in the cleaning cell (Uzoh, column 4, lines 1-12).

Regarding claim 4, Uzoh further teaches the method of claim 3, further comprising drying the substrate in the cleaning cell by rotating the substrate at a rate of between about 10 rpm and 500 rpm (Uzoh, column 4, line 4).

Regarding claim 5, Uzoh further teaches the method of claim 1, wherein heating the substrate comprises radiating the substrate while a rinsing fluid is dispensed thereon (Uzoh, column 4 line 5).

Regarding claim 6, Cheung further teaches the method of claim 1, further comprising drying the substrate in a cleaning cell, wherein timeframe between drying the substrate and annealing the substrate is between about 20 seconds and about 60 seconds [0025].

Regarding claim 7, Cheung and Uzoh both fail to teach the method of claim 6, wherein a duration of the drying is between about 5 seconds and about 25 seconds. However, given the teaching of the references, it would have been obvious to determine the optimum thickness, temperature as well as condition of delivery of the layers involved See *In re Aller, Lacey, and Hall* (10 USPQ 23 3-237) "It is not inventive to discover optimum or workable ranges by routine experimentation. Note that the specification contains no disclosure of either the critical nature of the claimed ranges or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant

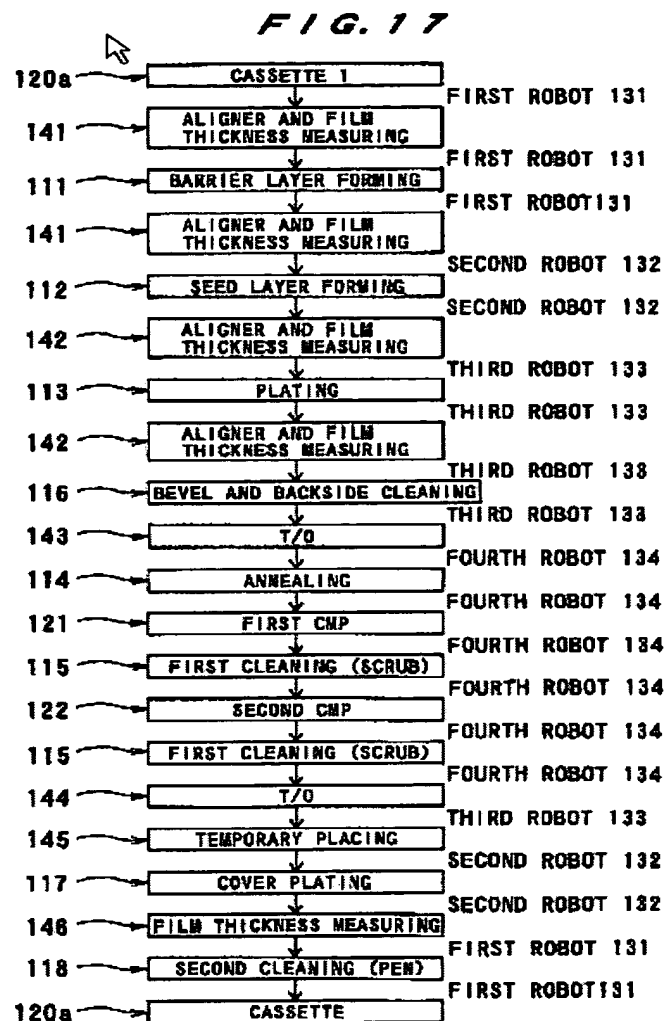
must show that tile chosen dimensions are critical. *In re Woodruff*, 919 f.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Any differences in the claimed invention and the prior art may be expected to result in some differences in properties. The issue is whether the properties differ to such an extent that the difference is really unexpected. *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Appellants have the burden of explaining the data in any declaration they proffer as evidence of non-obviousness. *Ex parte Ishizaka*, 24 USPQ2d 1621, 1624 (Bd. Pat. App. & Inter. 1992).

An Affidavit or declaration under 37 CFR 1.132 must compare the claimed subject matter with the closest prior art to be effective to rebut a prima facie case of obviousness. *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979).

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh as applied to claim 8 above, and further in view of Kimura et al., US Patent Application 2001/0024691. See Kimura Figure 17 below.





Regarding claim 9, Uzoh fails to teach the method of claim 8, further comprising transferring the substrate from the spin rinse dry cell to the annealing station. Kimura teaches transferring the substrate from the spin rinse dry cell 116 to the annealing station 114 [0279]. It would have been obvious to one skilled in the art to combine the teachings of Kimura with that of Uzoh because various changes in the substrate processing process can be easily performed (Kimura [0072]).

Regarding claim 10, Uzoh further teaches the method of claim 9, wherein heating comprises dispensing a heated rinsing solution onto the substrate (column 4, lines 11-13).

Regarding claim 11, Uzoh further teaches the method of claim 10, wherein the heated rising solution comprises deionized water at a temperature of between about 50°C and about 100°C (column 4, lines 11-13).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh and Kimura as applied to claim 9 above, and further in view of Cheung, US Patent Application Publication 2002/0130046. Uzoh and Kimura fail to teach the method of claim 9, further comprising transferring the substrate from the spin rinse dry cell to the annealing station when the preheating is finished, the transferring process having a duration of between about 20 seconds and about 60 seconds. Cheung teaches the transferring process having a duration of between about 20 seconds and about 60 seconds [0025]. It would have been obvious to one skilled in this art to combine the teachings of Cheung with Uzoh and Kimura because one advantage of such in-situ processing is that the time delay between the cleaning and annealing steps can be kept relatively short (Cheung, [0025]).

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh as applied to claim 8 above, and further in view of Ivanov, US Patent Application 2004/0097071. Please see figure 1 directly below paragraph.

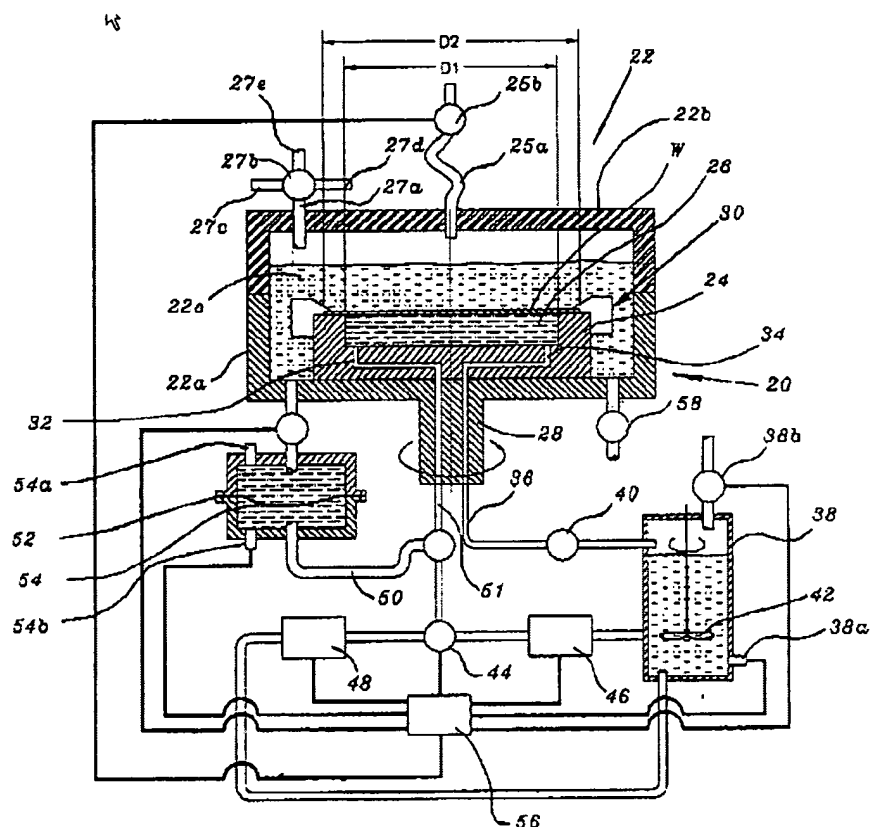


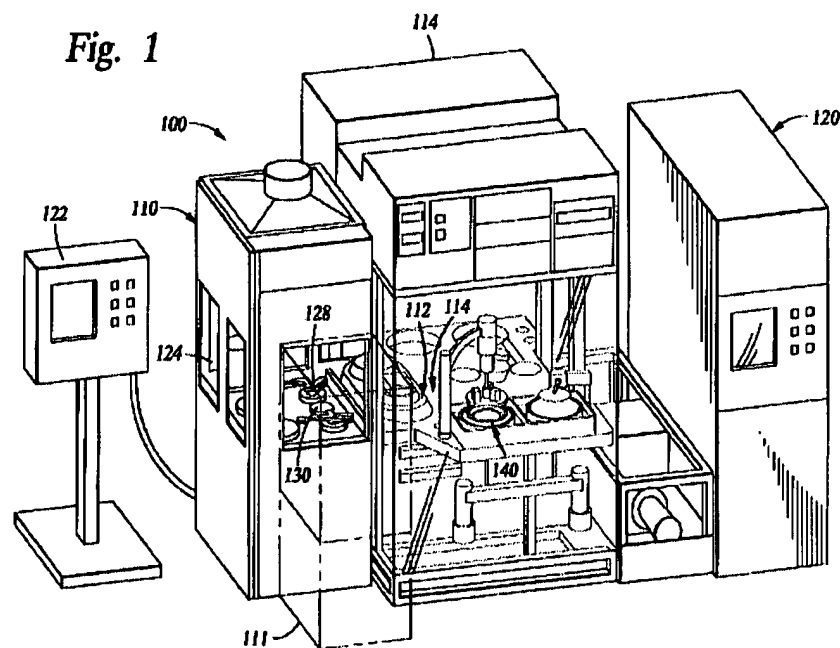
Fig. 1

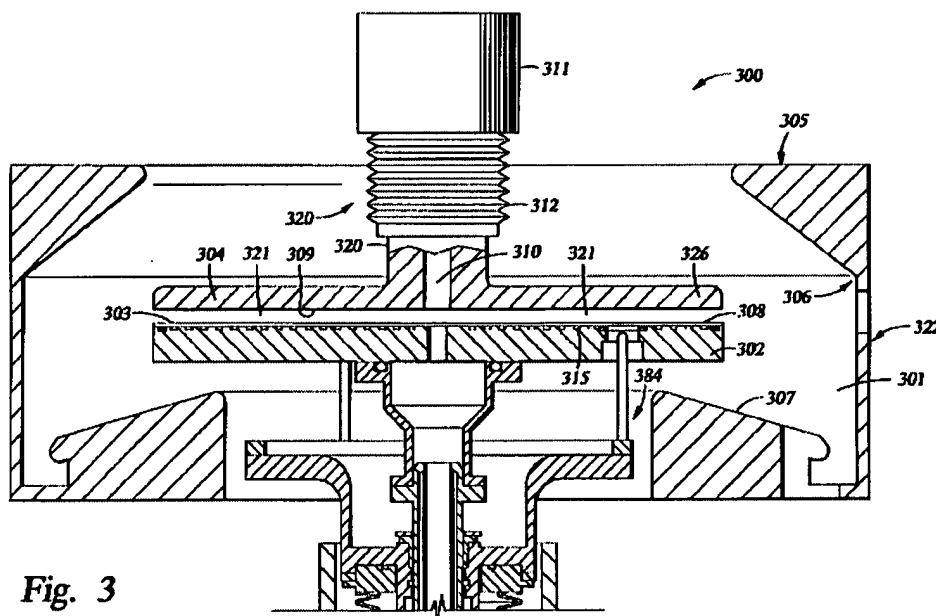
Regarding claim 15, Uzoh fails to teach the method of claim 8, but further comprising controlling a temperature of a rinsing fluid to remain at a constant temperature. Ivanov teaches controlling a temperature of a rinsing fluid to remain at a constant temperature 46. It would have been obvious to one skilled in the art to combine

the teachings of Uzoh and Ivanov in order to control the temperatures of the processes (Ivanov, [0083]).

Regarding claim 16, Ivanov further teaches the method of claim 15, further comprising reading a temperature of a heated solution with a thermocouple **38a** and controlling a heater positioned in communication with the rinsing solution in accordance with a temperature indicated by the thermocouple **38a**.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lubomirsky, US Patent Application Publication 2003/0131494 and Uzoh et al, US Patent 6,692,588. See Lubomirsky's Figures 1 and 3 directly below.



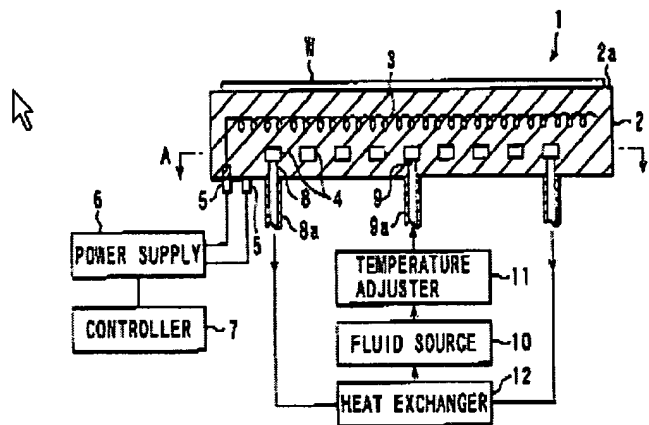


Lubomirsky teaches an apparatus for processing a substrate, comprising of a plating cell positioned on a processing platform, the plating cell being configured to plate a conductive layer onto the substrate, **figure 1-100**, a rinsing cell **figure 1-112** positioned on the processing platform, the rinsing cell comprising of a substrate support member configured to support the substrate for processing, **figure 3-302**, and a substrate annealing station positioned in communication with the processing platform, **figure 1-111**. Lubomirsky fails to teach a radiant fluid heating assembly connected to the rinsing cell and disposed to provide radiant heat directly to heat the substrate.

Uzoh teaches a radiant fluid heating assembly connected to the rinsing cell and disposed to provide radiant heat directly to heat the substrate (column 4). It would have been obvious to one skilled in the art to combine the teachings of Uzoh with that of

Lubomirsky because tool cross contamination by way of plated metal is greatly reduced and annealing time of grain growth is dramatically reduced (Uzoh, abstract)

Claim 20 rejected under 35 U.S.C. 103(a) as being possibly being unpatentable over Lubomirsky and Uzoh et al as applied to claim 17 above, and further in view of Narushima, US Patent 6,951,587.



Regarding claim 20, Lubomirsky and Uzoh fail to teach the apparatus of claim [17], wherein the radiant heating assembly further comprises a temperature monitoring device, the temperature monitoring device being configured to monitor the temperature of the substrate and control application of electrical power to the radiant heating assembly. Narushima teaches a radiant heating assembly 1 further comprises a temperature monitoring device 7, the temperature monitoring device being configured to monitor the temperature of the substrate and control application of electrical power to the radiant heating assembly. It would have been obvious to one skilled in the art to

combine the teachings of Narushima with that of Lubomirsky and Uzoh because Narushima's invention to provide a ceramic heater system ensures the desired uniform heating performance even if the fluid is provided below the heater (Narushima, column 12, lines 2-3).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quovaunda Jefferson whose telephone number is 571-

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272-5051. The examiner can normally be reached on Monday through Friday, 8AM to 4:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qvj



**W. DAVID COLEMAN**  
**PRIMARY EXAMINER**